July 2, 2008

Via Electronic Filing

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW, TW – A325
Washington, DC 20554

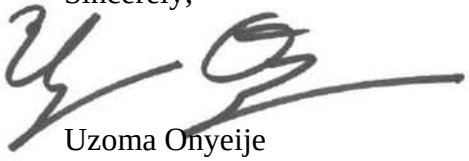
Re: WT Docket Nos. 07-195, 04-356, 07-16 and 07-30 – Notification of Oral Ex Parte Presentation

Dear Ms. Dortch:

On July 2, 2008 John Muleta, Paul J. Kolodzy and the undersigned on behalf of M2Z Networks, Inc. met with Mr. Bruce Gottlieb, Legal Advisor to Commissioner Michael J. Copps. During the meeting, M2Z explained why there is ample justification for establishing reasonable and technologically neutral technical rules including a 43 +10 log(P) out of band emission limit. Enclosed is a presentation provided by M2Z to Mr. Gottlieb.

Pursuant to Section 1.1206(b) of the Commission rules, an electronic copy of this letter is being filed. Please let me know if you have any questions regarding this submission.

Sincerely,



Uzoma Onyeije

cc: Mr. Bruce Gottlieb

2000 North 14th Street · Suite 600 · Arlington, VA 22201
OFFICE 703.894.9500 FAX 703.894.9501

M2Z networks

Freedom. Innovation.

OVERVIEW OF TECHNICAL ISSUES CONCERNING THE AWS-3 SERVICE RULES

July 1, 2008

Overview

I. The FCC should not depart from its technologically neutral and flexible precedents and impose technical rules that preclude broadband services in the AWS-3 band.

II. Despite FCC precedents to the contrary, certain AWS-1 licensees now seek to establish an interference protection regime that is both arbitrarily defined and vastly greater than the scope of their FCC authorizations.

III. The existence of mutual interference concerns between AWS-1 and AWS-3 provides both sets of licensees with the incentives to cooperate and avoid harmful interference.

IV. Harmful interference from AWS-3 mobiles to AWS-1 mobiles are rare and highly probabilistic events that can be easily avoided or mitigated without resorting to overly restrictive or technologically biased rules.

I. The FCC should not depart from its most recent technical precedents and impose rules that preclude broadband services in the AWS-3 band.

- In the 700 MHz proceeding, the FCC did not impose guard bands and used flexible rules including an OOBE of 43 +10 log (P) to address potential interference where mobile uplink operates adjacent to mobile downlink.
- The proposed 2155-2180 rules give the AWS-1 licensees extraordinary protection as **it would limit out-of-band emissions to less than 2 percent of what was permitted in AWS-1 and 700 MHz**.[1]
- Parties opposed to the Commission's proposed AWS-3 Rules seek solutions that are not technologically neutral and would preclude broadband services in the band.
  - For example, AT&T seeks limits on AWS-3 mobiles that amount to **1/50,000th (0.002%) of the mobile out-of-band emissions permitted in AWS-1 and 700 MHz.**
  - T-Mobile and Verizon Wireless, on the other hand, want to explicitly ban two way broadband services in AWS-3.
  - Some of these parties also seek a 10 -15 MHz guard band.

[1] OOBE differences appear deceptively minute at first glance. However, that these numbers are based on a log scale. So, for example, a 3dB increase (to 46 +10 log (P)) results in a 50% reduction in emissions. Using the following formula: 10^(-x/10) -- where x represents the 17 dB difference between 43 and 60, the actual emissions are 1/50th (2%) of the emissions permitted in AWS-1 and 700 MHz.

Broadband Emission Limits Adjusted Over 1 MHz.

EMISSION BAND	Permitted Channel Adjacencies	OOBE Limit	OOBE Measurement Bandwidth	Adjusted OOBE LIMIT @ 1 MHZ bandwidth[1]
BROADBAND PCS	FDD Downlink only	43 + 10 log (P)	1 MHz	43 + 10 log (P)
BRS	FDD and TDD (mobile-to-mobile)	43 + 10 log (P)	1 MHz	43 + 10 log (P)
AWS-1	FDD Downlink only	43 + 10 log (P)	1 MHz	43 + 10 log (P)
700 MHZ–PUBLIC SAFETY	FDD and TDD (mobile-to-mobile)	65 + 10 log (P)	6.25 KHz	43 + 10 log (P)
700 MHZ	FDD and TDD (including mobile-to-mobile)	43 + 10 log (P)	100 kHz	33 + 10 log (P)

[1] Conversion from A + 10 log (P) over bandwidth BW (in kilohertz) to B + 10 log (P) over 1 MHz bandwidth is B = A + 10 log (BW/1000). Thus 65 + 10 log (P) over 6.25 kHz computes to B = 65 + 10 log (6.25/1000) = 65 – 22 = 43, and thus is equal to 43 + 10 log (P) over 1 MHz.

Within the context of 700 MHz, there are two specific cases where mobile uplink operations are adjacent to mobile downlink operations and could result in potential interference. In these situations, the Commission's 43 + 10 log (P) OOBE limits apply:

- Narrowband public safety mobile reception (769-775 MHz) from possible Upper 700 C-Block mobile transmission (776-787 MHz); and
- Lower 700 D-Block mobile reception (716-722 MHz) from possible Lower 700 C-Block TDD mobile transmission (710-716 MHz).
- In addition, the FCC permitted, at the discretion of the licensee, that any of the Lower 700 MHz blocks could include two way transmissions at 43 + 10 log (P) regardless of the operations in the neighboring band.
- The same rules should apply here.

Departure from the 43 +10 log (P) precedent will have a significant detrimental impact on AWS-3 capacity to deliver broadband.

AWS-3 Unilateral OOBE Level	Useable BandWidth for AWS-3		AWS-1 Capacity Impact (at various AWS-1 BaseStation XMT levels)	
	20 MHz (2155-2175 MHz)	25 MHz (2155-2180 MHz)	BS XMT EIRP 59 dBm	BS XMT EIRP 69 dBm
43 + 10 log (P)	~19.5 MHz	~24.5 MHz	4.1%	<0.1%
55 + 10 log (P)	~15.0 MHz	~20.0 MHz	0.4%	<0.1%
60 + 10 log (P)	~13.0 MHz	~18.0 MHz	0.1%	<0.1%

- **Full study by Alion Science and Technology available at http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6520012387**

II. Despite FCC precedents to the contrary, certain AWS-1 licensees now seek to establish an interference protection regime that is both arbitrarily defined and vastly greater than the scope of their FCC authorizations.

Rights and Responsibilities of ALL FCC Licensees

- To use the spectrum license within bounds of the rights established by the FCC at the time of licensing (e.g., spectral and geographic boundaries, power limits, OOBE, build out requirements, etc.)

- To conduct full due diligence on all factors affecting license rights especially when provided notice. Auction participation does not abrogate the licensees' responsibility to conduct full technical and business due diligence.

- To properly design and operate networks within the bounds of the spectrum license terms

- To properly design and operate CPE within the bounds of the license terms.

- To be afforded protection from harmful interference if and when it occurs and cooperate with adjacent licensees to avoid mutual harmful interference (see Sections III and IV).

RIGHT/RESPONSIBILITY: To use the spectrum license within bounds of the rights established by the FCC at the time of licensing (e.g., spectral and geographic boundaries, power limits, OOBE, build out requirements, etc.)

FACT: the Commission provided AWS-1 F block licensee 20 MHz block with the requirement to use these large blocks to internalize adjacent channel interference

- In 2003, the Commission stated that its decision "provides licensees with maximum flexibility to resolve adjacent band interference issues" by "placing the larger 30 MHz blocks at either end of the two bands so the licensees "will have sufficient bandwidth and maximum flexibility to resolve adjacent band interference concerns." *See* FCC 03-251 ¶ 43 (Nov. 23, 2003).
- T-Mobile (and others), however, sought smaller spectrum blocks arguing that "[s]pectrum blocks exceeding a carrier's needs no doubt result in unnecessary transaction costs that potentially delay the availability of spectrum to those that value it most." T-Mobile Ex Parte, WT Docket No. 02-353 (Mar. 15, 2005).
- Later in 2005, the Commission reduced the size of the larger AWS-1 blocks but reaffirmed the "rationale stands" for having larger blocks at the ends of AWS-1 and stated that "[l]icensees of the larger blocks should be better able to internalize interference management measures than would licensees of smaller blocks." *See* FCC 05-149 ¶ 19 (Aug. 15, 2005).

QUESTION: Have AWS-1 F block licensees designed their networks to internalize adjacent channel interference as mandated by the Commission?

RIGHT/RESPONSBILITY: To conduct due diligence "on all marketplace and technical factors" prior to Auction 66 including future potential allocations.

FACT: The Commission noted its plans to permit TDD services in the AWS-3 band before and after Auction 66.

- "We envision that this spectrum could be offered in equally sized paired blocks to support FDD or TDD applications, or a combination of these technologies." FCC 03-16 ¶ 68 (Feb. 10, 2003); "[T]he 2155-2180 MHz band could be used to support TDD operations . . ." *Id.* at ¶ 69.

- "We will make every effort to provide spectrum opportunities for TDD systems in future allocation and spectrum proceedings, such as in the AWS Allocation proceeding." FCC 03-251 ¶ 46 (Nov, 23, 2003).

- In fact, in May 2006, M2Z filed a license application seeking to use TDD in AWS-3 and AWS-1 licensees noted the potential of a TDD operation in the adjacent band.

  - **"The FCC also has allocated an additional 40 MHz of spectrum devoted to AWS. It is in the process of considering the channel assignment policies for 20 MHz of this spectrum and has indicated that it will initiate a further proceeding with regard to the remaining 20 MHz in the future." MetroPCS SEC Form S-1 Filed 05-15-2007**

- The AWS-1 auction commenced in August 2006 with no TDD-related objections.

QUESTION: In light of the FCC's desire to have more broadband spectrum, the Commission's desire to allocate AWS-3 for TDD, and M2Z's license application requesting authorization to operate a TDD based broadband service in AWS-3, what basis is there for the claim that AWS-1 licensees were unaware that TDD could be deployed in the adjacent band?

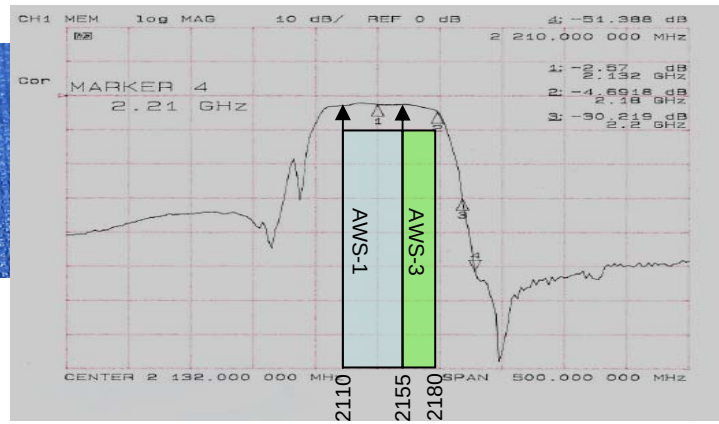
RIGHT/RESPONSIBILITY: AWS-1 F Block licensees now have the right to increase their base station power levels up to 10 times more than the original limits afforded to them at the time of license grant.

FACT: In order for its rules to be technologically neutral and promote wideband technologies necessary for broadband services, the FCC recently permitted AWS-1 licensees to increase their base station power levels by using Power Spectral Density measurements. FCC 08-85 (Mar. 21, 2008).

QUESTION: How does this ten-fold increase in base station power for AWS-1 F block impact the value of those licenses? In what ways does the increase in power impact adjacent band operations?

RIGHT/RESPONSIBILITY: To design and operate CPE within the bounds of the license terms

FACT: Some AWS-1 CPE were deployed with filters that pass through 2110-2180 MHz rather than 2110-2155 MHz.



QUESTIONS: Did the AWS-1 licensees conduct an analysis of the impact of using band pass filters that extend beyond the boundary of the license? Did they conduct any cost/benefit analysis on the impact of using inappropriate filters? Have they quantified the relative impact of using these filters on potential interference claims?

III. Mutual Interference provides AWS-3 and AWS-1 licensees the proper incentive to cooperate and avoid harmful interference.

- Cooperation is standard practice in the wireless industry and occurs whenever there are mutual interference concerns---PCS interference mitigation model should be used as a reference

- AWS-3 faces the potential of continuous base to base harmful interference from AWS-1 base stations potentially precluding AWS-3 deployment without AWS-1 licensees' cooperation

  - Contrary to recent assertions by CTIA and T-Mobile, Verizon Wireless previously explained that in addition to mobile-to mobile interference, "the risk of harmful interference to AWS-3 base stations is also significant." Verizon Wireless Reply Comments, WT Docket 07-195 (Jan. 14, 2008).

- AWS-1 mobiles may encounter intermittent and highly probabilistic harmful interference occurrences from AWS-3 mobiles.

IV. The potential for harmful interference from AWS-3 to AWS-1 is rare under a proper probabilistic analysis, easily avoided and limited (if it does occur).

- There must be the simultaneous alignment of several independent events for there to even be a chance of harmful interference.
- The AWS-3 and AWS-1 licensee can employ a myriad of mitigation techniques.
- AWS-1 licensees can further mitigate interference concerns (without a loss of network capacity) by using their alternative frequencies when interference occurs.
- If after all these measures have been taken and harmful interference still occurs, it would be limited in time and geography.

Several unrelated events must occur simultaneously for there to be any chance for mobile-to-mobile interference

1. Operating close in space.
2. Operating far from base stations.
3. Operating close in frequency.
4. Overlapping in time.

There are many interference mitigation techniques including:

- Base station siting
- Antenna polarization
- Adaptive antennas
- Transmitter/Receiver Improvements
- Power control
- Mobile handover to additional spectrum
- Intersystem frequency coordination
- Cognitive radio technology for interference control

Summary

1. **Years before the AWS-1 auction the Commission acknowledged that AWS-3 could be used for TDD operations**
2. **The AWS-1 Band Plan specifically provided additional spectrum for addressing possible adjacent band interference**
3. **AWS-1 licensees were provided more transmission power AFTER the Auction which significantly improved their ability to address interference**
4. **Technical rules should follow precedent and preserve the ability for licensees to cooperatively address mutual interference issues:**
   - Mobile-to-Mobile interference is statistical in nature
   - Base-to-Base interference is continuous and non-varying.
5. **Improper filter design has unnecessarily exacerbated what should be a rare interference case for the AWS-1 licensees**
6. **Impact of more stringent AWS-3 emission rules (than for AWS-1, BRS, 700 MHz) will reduce the amount of usable spectrum to provide broadband service.**